Amendments to the Claims

1.(currently amended) A process of making a storage device comprising:

forming a first electrode ~~on~~ over a substrate;

forming a ferroelectric polymer structure over the substrate;

forming ~~an upper~~ a protective film over the ferroelectric polymer structure; and

forming a second electrode ~~on~~ over the ~~second~~ protective film, wherein the storage device is a non-optical storage device.

2.(currently amended) The process according to claim 1, wherein the ~~upper~~ protective film is a second protective film, and further comprising:

forming a first protective film on the first electrode.

3.(original) The process according to claim 2, wherein forming a first protective film on the first electrode further comprises:

forming a self-aligned first protective film over the first electrode.

4.(currently amended) ~~The process according to claim 2,~~

A process of making a storage device comprising:

forming a first electrode over a substrate;

forming a ferroelectric polymer structure over the substrate;

forming a first protective film over the ferroelectric polymer structure; and

forming a second electrode over the first protective film;

forming a second protective film over the first electrode, wherein forming a ~~first~~ second protective film ~~on~~ over the first electrode~~, further~~ comprises:

forming a damascene structure in the substrate from the first electrode and the ~~first~~ second protective film by a process selected from mechanical polishing, chemical-mechanical polishing, chemical etchback, and combinations thereof.

5.(original) The process according to claim 2, wherein the first protective film and the second protective film are formed by atomic layer chemical vapor deposition of materials selected from metals, refractory metals, their alloys, their nitrides, oxides, and carbides, and combinations thereof.

6.(currently amended) ~~The process according to claim 1,~~

A process of making a storage device comprising:

forming a first electrode over a substrate;

forming a ferroelectric polymer structure over the substrate;

forming a protective film over the ferroelectric polymer structure; and

forming a second electrode over the protective film, wherein forming a ferroelectric polymer structure ~~further~~ comprises:

forming a first ferroelectric polymer layer over the substrate;

forming a spin-on ferroelectric polymer layer over the first ferroelectric polymer layer; and

forming a second ferroelectric polymer layer over the spin-on ferroelectric polymer layer.

7.(original) The process according to claim 1, wherein forming a ferroelectric polymer structure further comprises:

Langmuir-Blodgett depositing a first crystalline ferroelectric polymer layer over the substrate;

forming a spin-on ferroelectric polymer layer over the first ferroelectric polymer layer, wherein the spin-on ferroelectric polymer layer is selected from polyvinyl and polyethylene fluorides, polyvinyl and polyethylene chlorides, polyacrylonitriles, polyamides, copolymers thereof, and combinations thereof;

Langmuir-Blodgett depositing a second crystalline ferroelectric polymer layer over the spin-on polymer layer; and

wherein the first and second crystalline ferroelectric polymer layers are selected from polyvinyl and polyethylene fluorides, polyvinyl and polyethylene chlorides, polyacrylonitriles, polyamides, copolymers thereof, and combinations thereof.

8.(original) The process according to claim 2, wherein forming the first and second protective films are accomplished by atomic layer chemical vapor deposition of a composition selected from titanium metal, titanium metal alloys, at least one titanium nitride, at least one titanium carbide, at least one titanium oxide, and combinations thereof.

9.(original) The process according to claim 1, wherein forming a first electrode is carried out by chemical vapor deposition, and forming a second electrode is carried out by physical vapor deposition.

10.(original) The process according to claim 1, wherein forming a ferroelectric polymer structure over the substrate further comprises:

Langmuir-Blodgett depositing a single, crystalline ferroelectric polymer layer over the substrate.

11.(currently amended) A memory ~~article~~ comprising:

a first electrode disposed ~~on~~ <u>over</u> a substrate;

a ferroelectric polymer structure disposed over the substrate;

~~an upper~~ <u>a</u> protective film disposed over the ferroelectric polymer structure; and

a second electrode disposed ~~above and on~~ <u>over</u> the ~~second~~ protective film<u>, wherein the memory is a non-optical memory</u>.

12.(currently amended) The memory ~~article~~ according to claim 11, wherein the ~~upper~~ protective film is a second protective film, and further comprising:

a first protective film disposed on the first electrode.

13.(currently amended) ~~The memory article according to claim 11,~~ A memory comprising:

a first electrode disposed over a substrate;

a ferroelectric polymer structure disposed over the substrate;

a protective film disposed over the ferroelectric polymer structure; and

a second electrode disposed over the protective film, wherein the ferroelectric polymer structure ~~further~~ comprises:

a first crystalline ferroelectric polymer layer disposed over the substrate;

a spin-on ferroelectric polymer layer disposed over the first crystalline ferroelectric polymer layer; and

a second crystalline ferroelectric polymer layer disposed over the spin-on polymer layer.

14.(currently amended) The memory ~~article~~ according to claim 11, wherein the ferroelectric polymer structure further comprises:

a first crystalline ferroelectric polymer layer disposed over the substrate, wherein the first crystalline ferroelectric polymer layer has a thickness in a range from about 5 Å to about 45 Å;

a spin-on ferroelectric polymer layer disposed over the first crystalline ferroelectric polymer layer, wherein the spin-on ferroelectric polymer layer has a thickness in a range from about 500 Å to about 2,000 Å; and

a second crystalline ferroelectric polymer layer disposed over the spin-on polymer layer, wherein the second crystalline ferroelectric polymer layer has a thickness in a range from about 5 Å to about 45 Å.

15.(currently amended) The memory ~~article~~ according to claim 13, wherein the spin-on ferroelectric polymer layer and the crystalline ferroelectric polymer layers are made of the same composition.

16.(currently amended) The memory ~~article~~ according to claim 11, wherein the ferroelectric polymer structure further comprises:

a first crystalline ferroelectric polymer layer disposed over the substrate;

a spin-on polymer layer disposed over the first crystalline ferroelectric polymer layer;

a second crystalline ferroelectric polymer layer disposed over the spin-on polymer layer; and

wherein crystallinity of the first and second crystalline ferroelectric polymer layers is in a range from about one-third to greater than about one-half.

17.(currently amended) The memory ~~article~~ according to claim 11, wherein the ferroelectric polymer structure further comprises:

a single, crystalline ferroelectric polymer layer disposed over the substrate, wherein the single, crystalline ferroelectric polymer layer has a thickness in a range from about 100 Å to about 2,000 Å.

18.(currently amended) The memory ~~article~~ according to claim 11, wherein the ferroelectric polymer structure further comprises a polymer selected from polyvinyl and polyethylene fluorides, polyvinyl and polyethylene chlorides, polyacrylonitriles, polyamides, copolymers thereof, and combinations thereof.

Claims 19 and 20 (cancelled)

21.(original) A cross-point matrix polymer memory structure comprising:

a first aluminum or copper electrode disposed on a substrate;

a first refractory metal nitride or oxide protective film disposed above and on the first electrode;

a ferroelectric polymer structure disposed over the substrate and the first protective film;

a second refractory metal nitride or oxide protective film disposed over the ferroelectric polymer structure; and

a second aluminum or copper electrode disposed above and on the second refractory metal nitride protective film.

22.(original) The cross-point matrix polymer memory structure according to claim 21, wherein the ferroelectric polymer structure further comprises:

a first crystalline ferroelectric polymer layer disposed over the substrate, wherein the first crystalline ferroelectric polymer layer has a thickness in a range from about 5 Å to about 45 Å;

a spin-on ferroelectric polymer layer disposed over the first crystalline ferroelectric polymer layer, wherein the spin-on ferroelectric polymer layer has a thickness in a range from about 500 Å to about 2,000 Å;

a second crystalline ferroelectric polymer layer disposed over the spin-on polymer layer, wherein the second crystalline ferroelectric polymer layer has a thickness in a range from about 5 Å to about 45 Å; and

wherein crystallinity of the first and second crystalline ferroelectric polymer layers is in a range from about one-third to greater than about one-half.

23.(original) The cross-point matrix polymer memory structure according to claim 21, wherein the ferroelectric polymer structure further comprises:

a crystalline ferroelectric polymer layer disposed above and on the first refractory metal nitride or oxide protective film, and below and on the second refractory metal nitride or oxide protective film, wherein the crystalline ferroelectric polymer layer has a thickness in a range from about 100 Å to about 2,000 Å; and

wherein the second refractory metal nitride or oxide protective film is disposed above and on the crystalline ferroelectric polymer layer.

24.(original) The cross-point matrix polymer memory structure according to claim 21, wherein the ferroelectric polymer structure further comprises a polymer selected from $(CH_2\text{-}CF_2)_n$, $(CHF\text{-}CF_2)_n$, $(CF_2\text{-}CF_2)_n$, α-, β-, γ-, and δ-phases thereof, $(CH_2\text{-}CF_2)_n\text{-}(CHF\text{-}CF_2)_m$ copolymer, α-, β-, γ-, and δ-phases of $(CH_2\text{-}CF_2)_n\text{-}(CHF\text{-}CF_2)_m$ copolymer, and combinations thereof.

25.(original) The cross-point matrix polymer memory structure according to claim 21, wherein the ferroelectric polymer structure further comprises a copolymer selected from α-, β-, γ-, and δ-phases of $(CH_2\text{-}CF_2)_n\text{-}(CHF\text{-}CF_2)_m$ copolymer, wherein n and m equal 1, and wherein n is in a fraction range from about 0.6 to about 0.9.

26.(original) The cross-point matrix polymer memory structure according to claim 21, wherein the ferroelectric polymer structure further comprises β-phase $(CH_2\text{-}CF_2)_n$ in $(CH_2\text{-}CF_2)_n\text{-}(CHF\text{-}CF_2)_m$ copolymer, wherein n and m equal 1, and wherein n is in a fraction range from about 0.7 to about 0.8.

27.(currently amended) A ~~memory~~ system comprising:

~~a substrate disposed on a physical interface for a host;~~

a portable wireless communication device comprising a non-optical memory ~~article disposed on the substrate~~, the non-optical memory ~~article~~ comprising:

a first electrode disposed on a substrate;

~~a first protective film disposed above and on the first electrode;~~

~~an FEP~~ a ferroelectric polymer structure disposed over ~~the substrate and the first protective film~~ the first electrode;

a ~~second~~ protective film disposed over the ~~FEP~~ ferroelectric polymer structure; and

a second electrode disposed ~~above and on~~ over the ~~second~~ protective film~~;~~

~~a signal interface for communication from the memory article to the host; and~~

~~a host~~.

28.(currently amended) The memory system according to claim 27, wherein the non-optical memory further comprises a physical interface and wherein the physical interface is configured to a host interface that is ~~selected from~~ a PCMCIA card interface, a compact flash card interface, a memory stick-type card interface, a desktop personal computer expansion slot interface, ~~and~~ or a removable medium interface.

29.(currently amended) The memory system according to claim 27, wherein the ferroelectric polymer structure comprises:

a first crystalline ferroelectric polymer layer disposed over the substrate;

a spin-on ferroelectric polymer layer disposed over the first crystalline ferroelectric polymer layer; and

a second crystalline ferroelectric polymer layer disposed over the spin-on ferroelectric polymer layer.

30.(currently amended) The memory ~~article~~ according to claim 11, wherein the ferroelectric polymer structure comprises a spin-on polymer layer disposed over the substrate.

31.(newly added) The system of claim 27, further comprising another protective film between the first electrode and the ferroelectric polymer structure.

32.(newly added) The system of claim 27, wherein the portable wireless communication device is a wireless personal data assistant (PDA) or cellular telephone.

33.(newly added) An apparatus, comprising:

a first electrode;

a non-optical ferroelectric polymer memory structure; and

a first protective layer between the first electrode and the non-optical ferroelectric polymer memory structure.

34.(newly added) The memory of claim 33, wherein the first electrode comprises aluminum or copper.

35.(newly added) The memory of claim 33, further comprising:

a second electrode comprising aluminum or copper; and

a second protective layer between the between the first electrode and the non-optical ferroelectric polymer memory structure, wherein the second electrode comprises titanium and nitride.

36.(newly added) The memory of claim 33, further comprising a damascene structure comprising the first electrode and the protective layer.

37.(newly added) The memory of claim 35, wherein the non-optical ferroelectric polymer memory structure comprises:

a first polymer layer coupled to the first protective layer;

a second polymer layer coupled to the first polymer layer; and

a third polymer layer coupled to the second polymer layer.

38.(newly added) The memory of claim 33, wherein the non-optical ferroelectric polymer memory structure is a single, crystalline ferroelectric polymer layer having a thickness in a range from about 100 Å to about 2,000 Å.

39.(newly added) A memory, comprising:

a damascene structure comprising an electrode; and

a ferroelectric polymer structure formed over the damascene structure.

40.(newly added) The memory of claim 39, wherein the ferroelectric polymer structure comprises:

a first polymer layer coupled to the damascene structure;

a second polymer layer coupled to the first polymer layer; and

a third polymer layer coupled to the second polymer layer.

41.(newly added) The memory of claim 39, wherein the damascene structure further comprises a protective layer, wherein the protective layer is between the electrode and the ferroelectric polymer structure.

42.(newly added) The memory of claim 41, wherein the protective layer comprises titanium or nitride, the electrode comprises aluminum or copper, and the ferroelectric polymer structure includes a polymer layer selected from polyvinyl and polyethylene fluorides, polyvinyl and polyethylene chlorides, polyacrylonitriles, polyamides, copolymers thereof, or combinations thereof.

43.(newly added) A method, comprising:

forming a first crystalline ferroelectric polymer layer over a substrate;

forming a spin-on ferroelectric polymer layer over the first crystalline ferroelectric polymer layer; and

forming a second crystalline ferroelectric polymer layer over the spin-on polymer layer.

44.(newly added) The method of claim 43, wherein forming the first crystalline ferroelectric polymer layer comprises Langmuir-Blodgett depositing the first crystalline ferroelectric polymer layer over the substrate and wherein forming a second crystalline ferroelectric polymer layer comprises Langmuir-Blodgett depositing the second crystalline ferroelectric polymer layer over the spin-on polymer layer.

45.(newly added) The method of claim 43, further comprising: forming a damascene structure coupled to the first crystalline ferroelectric polymer layer, wherein the damascene structure comprises an electrode coupled to the first crystalline ferroelectric polymer layer.

46.(newly added) The method of claim 43, further comprising: forming a protective layer coupled to the first crystalline ferroelectric polymer layer, wherein the protective layer is formed by atomic layer chemical vapor deposition of materials selected from metals, refractory metals, their alloys, their nitrides, oxides, and carbides, and combinations thereof.